Textbook

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Mathematics

Test Edition

Based on Single National Curriculum 2020

$$2 + 5 = \frac{4}{2}$$
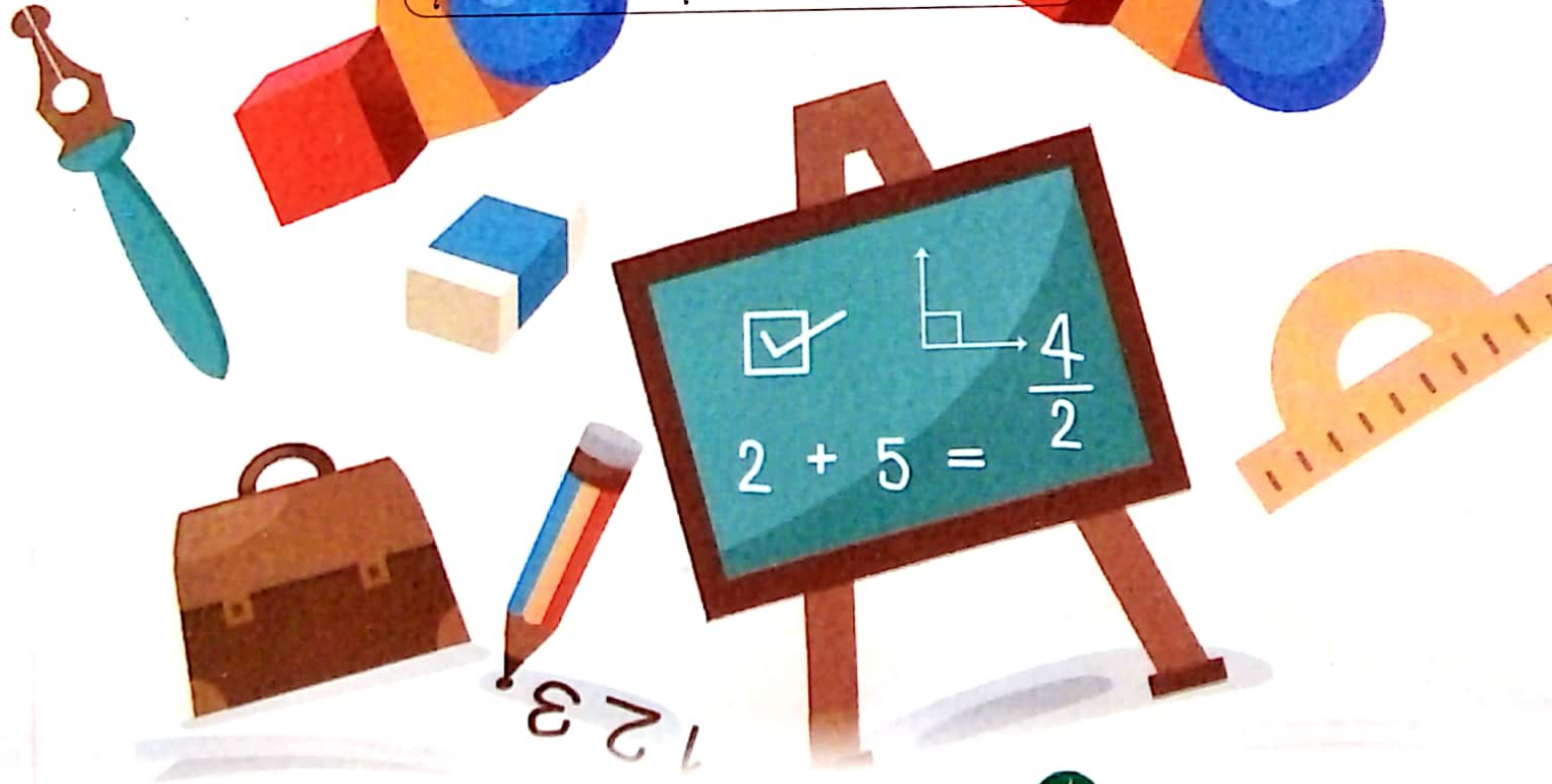
حکومت بلوچستان کا پروگرام "معیاری تعلیم سب کے لیے"

## Balochistan Textbook Board, Quetta

Content

Data Handling

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°F

Learning Outcomes

By the end of this unit, you will be able to:

- Find and describe average of given quantities in the data
- Solve real life situations involving average
- Organize the given data using bar graph
- Read and interpret a bar graph given in horizontal and vertical form
- Draw horizontal and vertical bar graphs for given data
- Solve real life situations using data presented in bar graphs.

Months	January	February	March	April	May
Average Temperature	18°C	19°C	21°C	24°C	28°C

Scale: 1 square = 5°C
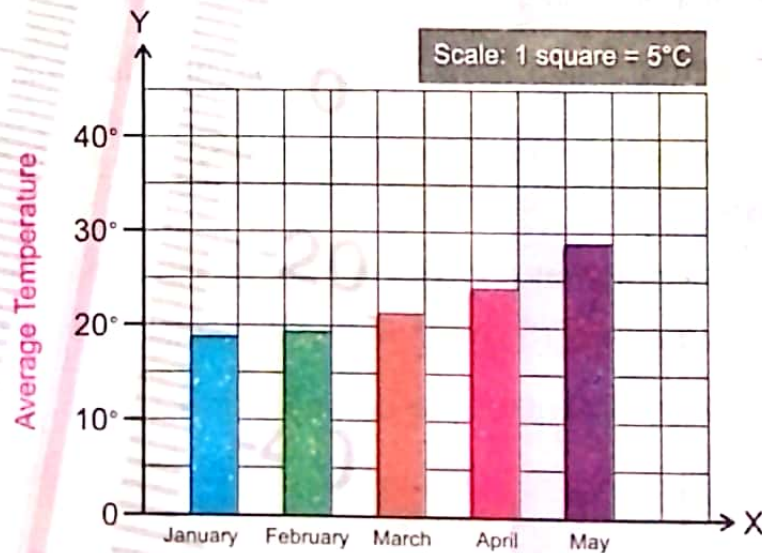
Umair made a graph of monthly average temperature capital for the first 5 months of 2020. Is his graph correct? If not then identify the mistake and correct it.

Average

We went to the seaside yesterday. I collected 16 seashells, my brother collected 12 seashells and my sister collected 11 seashells. How can we divide these seashells equally among us?

We will find the total number of seashells collected. Divide the total by the number of persons.

Sum of the seashells
$$= 16 + 12 + 11$$
$$= 39$$

Number of seashells each one will get $= \dfrac{39}{3}$

$$= 3$$

$$\begin{array}{r} 13 \\ \hline 3\,|\,39 \\ -3 \\ \hline 09 \\ 9 \\ \hline 0 \end{array}$$

Try Yourself

Find the average of 13, 34, 16 and 28.

Every person will get 13 seashells. We can say that 13 is the average of 16, 12 and 11. The average can be one of the values.

Key Fact

To find the average of the given quantities, we find the sum of the quantities and divide this sum by the number of quantities.

$$\text{Average} = \frac{\text{Sum of quantities}}{\text{Number of quantities}}$$

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The length of 5 ropes is 2.4 m, 0.9 m, 1.6 m, 4.4 m and 3m respectively. Find the average length of the ropes.

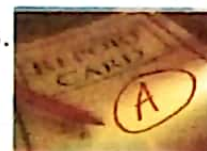$$\text{Average} = \frac{\text{sum of the lengths}}{\text{number of the ropes}}$$

$$\text{Average} = \frac{2.4 + 0.9 + 1.6 + 4.4 + 3}{5}$$

$$\text{Average} = \frac{12.3}{5}$$

$$\text{Average} = 2.46 \text{ m}$$

Average length of the rope is 2.46m

In the annual exams, Ali got an average of 78 marks in 7 subjects. Find the total marks he got.

$$\text{Average marks obtained} = \frac{\text{Total marks obtained}}{\text{Number of subjects}}$$

Total marks obtained = Average marks × number of subjects

$$= 78 \times 7$$
$$= 546$$

He scored 546 marks in 7 subjects.

Try Yourself

Find the average of 11, 23, 37, 55 and 82.

If the sum of quantities is 1840 and their average is 115, then find the number of quantities.

$$\text{Average} = \frac{\text{sum of quantities}}{\text{number of quantities}}$$

$$\text{Number of quantities} = \frac{\text{sum of quantities}}{\text{average}}$$

$$\text{Number of quantities} = \frac{1840}{115} = 16$$

Try Yourself

If the average of 40 quantities is 215, then find the sum of the quantities.

Divide the students into groups and ask them to measure the height of each of their group member and find their average height. Also compare their average with the other groups.

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Try Yourself

Find the number of quantities if their sum is 5200 and their average is 650.

Exercise 1

1. Find the average of the following.

a) 4, 13, 25,32, 42, 52

b) 12kg, 16kg, 26kg, 42kg

c) 10cm, 13cm, 17cm,16cm, 19cm

d) 5ℓ, 15ℓ, 30ℓ, 25ℓ, 40ℓ

2. Marwa reads 9, 11, 12, 10 and 8 Pages of a book in 5 days respectively. Find the average number of Pages she reads in one day.

3. Saad has 16, Amna has 20, Sara has 15 and Ahmad has 9 pencils. Find the average number of pencils.

4. The average number of students in 18 schools situated in a city is 1150. Find the total number of students in these schools altogether.

5. On an average, Maryam baked 27 cakes for a bakery in 11 months. What is the total number of cakes that she baked?

6. A factory hired a total of 1240 labourers in 4 years. Find the average number of labourers hired in a year.

7. The runs scored by the students of a class in a cricket match are given below.

Students	Aimen	Haniya	Marwa	Sara	Nadia	Saba	Amna
Runs	21	52	54	33	37	47	28

Find the average runs of the students.

Organize the Data using a Bar Graph

Drawing a Bar Graph

The following table shows the details of the marks obtained out of the 10 marks in the Maths test during last 4 months. I want to show it in a bar graph. What will be the procedure?

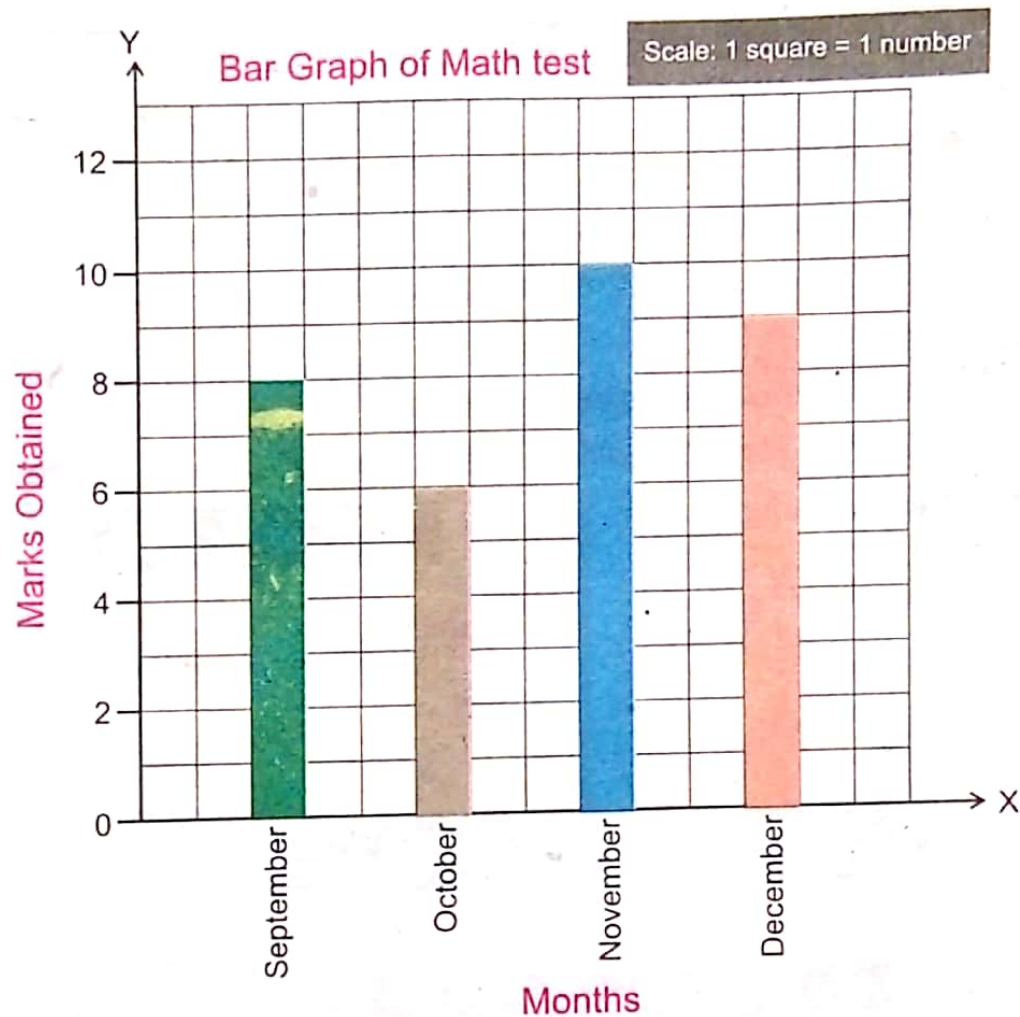| Months	September	October	November	December
Obtained numbers	8	6	10	9

The following method is used to create a bar graph.

- Mark the horizontal line as X-axis and the vertical line as Y-axis.
- Write the names of the months on the X-axis and the marks obtained on the Y-axis.
- One square with Y-axis represents 1 mark.
- 8 marks were obtained in September. So, we will color 8 squares along the Y-axis.
- Similarly, 6 marks were obtained in October. So, we will color 6 squares along the Y-axis.
- Complete the bar graph by coloring the number of squares for the marks obtained in all the months.

Ask the students to take a survey in the school. For example the favourite subjects of the students, favourite food, favourite hobbies etc. Ask them to organise this data using bar graph.

Bar Graph of Math test

Scale: 1 square = 1 number

Y-axis: Marks Obtained

X-axis: Months

September: 8
October: 6
November: 10
December: 9

Key Fact

- In a bar graph the width of each bar is same.
- The bar graph given above is a vertical bar graph. Similarly we can draw a horizontal bar graph.

The given table shows the number of cars of different colours in a car parking during a month. Represent this data in a horizontal bar graph.

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Colours	Blue	Black	Grey	Red
Number of cars	80	65	90	75

- Mark the horizontal line as X-axis and the vertical line as Y-axis.
- Write the number of cars on the x-axis and the colours of cars on the y-axis.
- One square with x-axis represents 10 cars.
- Complete the bar graph by coloring the number of squares for the number of cars of each colour.

Scale: 1 square = 10-cars

Number of cars
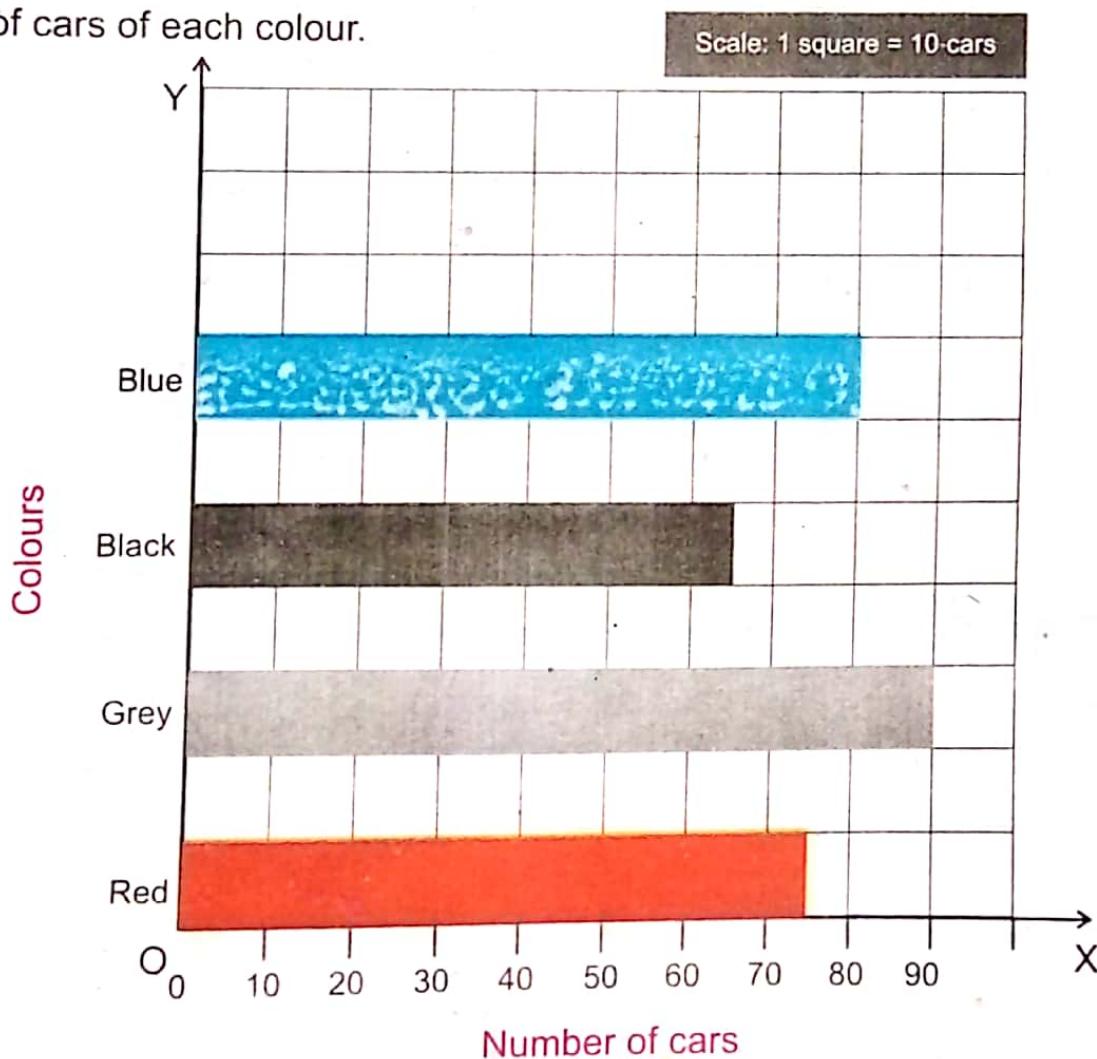
Try It! Challenge

Record the information about the favorite hobby of your classmates in a table. Then organize it with the help of horizontal bar graph.
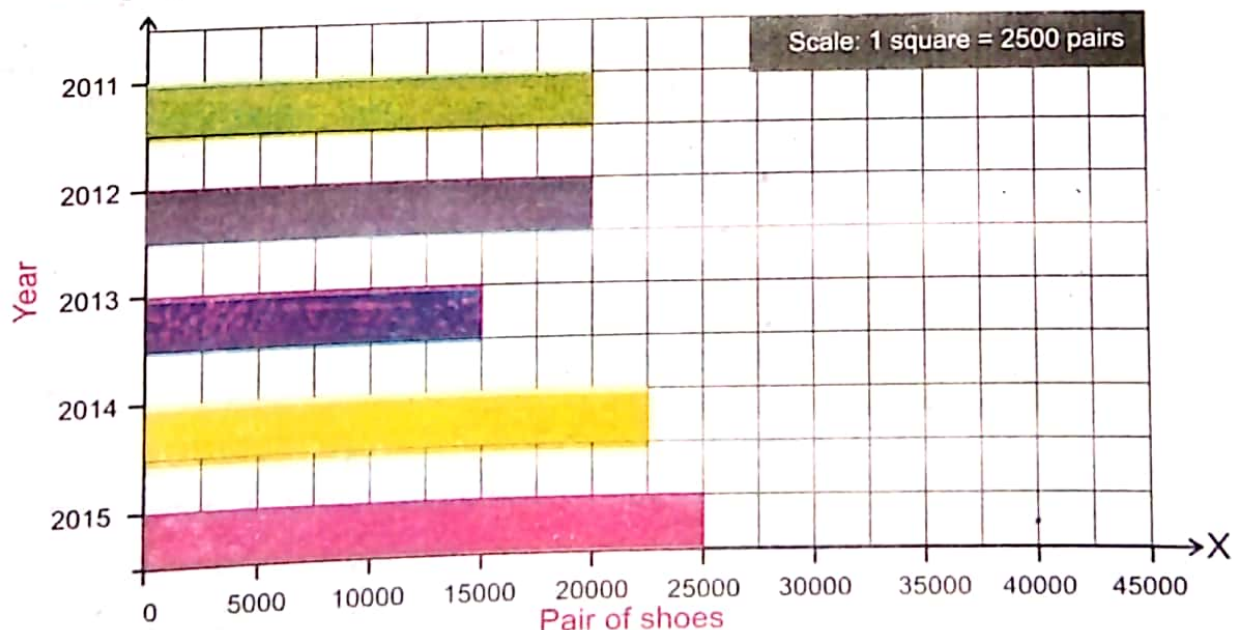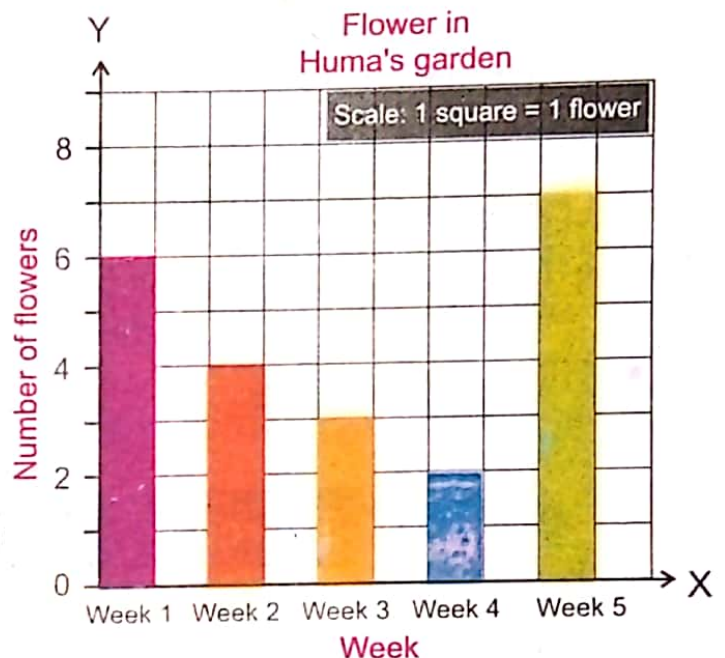
Reading a Bar Graph

The given bar graph shows the number of flowers that bloomed in Huma's garden during five weeks.

The graph shows:

- 6 flowers bloomed during the first week.
- 4 flowers bloomed during the second week.
- 3 flowers bloomed during the third week.
- 2 flowers bloomed during the fourth week.
- 7 flowers bloomed during the fifth week.
- The maximum flowers bloomed during the fifth week.
- Minimum flowers bloomed during the fourth week
- Find the answer of the given question by observing another bar graph.

Flower in Huma's garden

Scale: 1 square = 1 flower

Y — Number of flowers
X — Week (Week 1, Week 2, Week 3, Week 4, Week 5)

Scale: 1 square = 2500 pairs

Year (2011, 2012, 2013, 2014, 2015)

Pair of shoes (0, 5000, 10000, 15000, 20000, 25000, 30000, 35000, 40000, 45000)

1. In which year did the factory produce the most pairs of shoes?

2. In which year did the factory produce the fewest pairs of shoes?

3. In which year the factory made 20000 pairs of shoes?

4. How many less pairs of shoes were produced in 2011 than in 2015?

5. In which 2 years, the difference in the number of shoes in the factory was 10,000?

6. In which 3 years the total number of shoes in the factory was 55000?

7. How many pairs of shoes did the factory produce in these 5 years?

Exercise 2

1. Farwa asked about the most favourite fruit of each student in her class. The details of the answers given are shown in the table. Draw a horizontal bar graph of this data.

Favourite fruit	Strawberry	Apple	Banana	Mango
Number of students	5	4	8	9

2. The statistics of patients visiting a hospital during 5 months is given below. Draw a vertical bar of the given data.

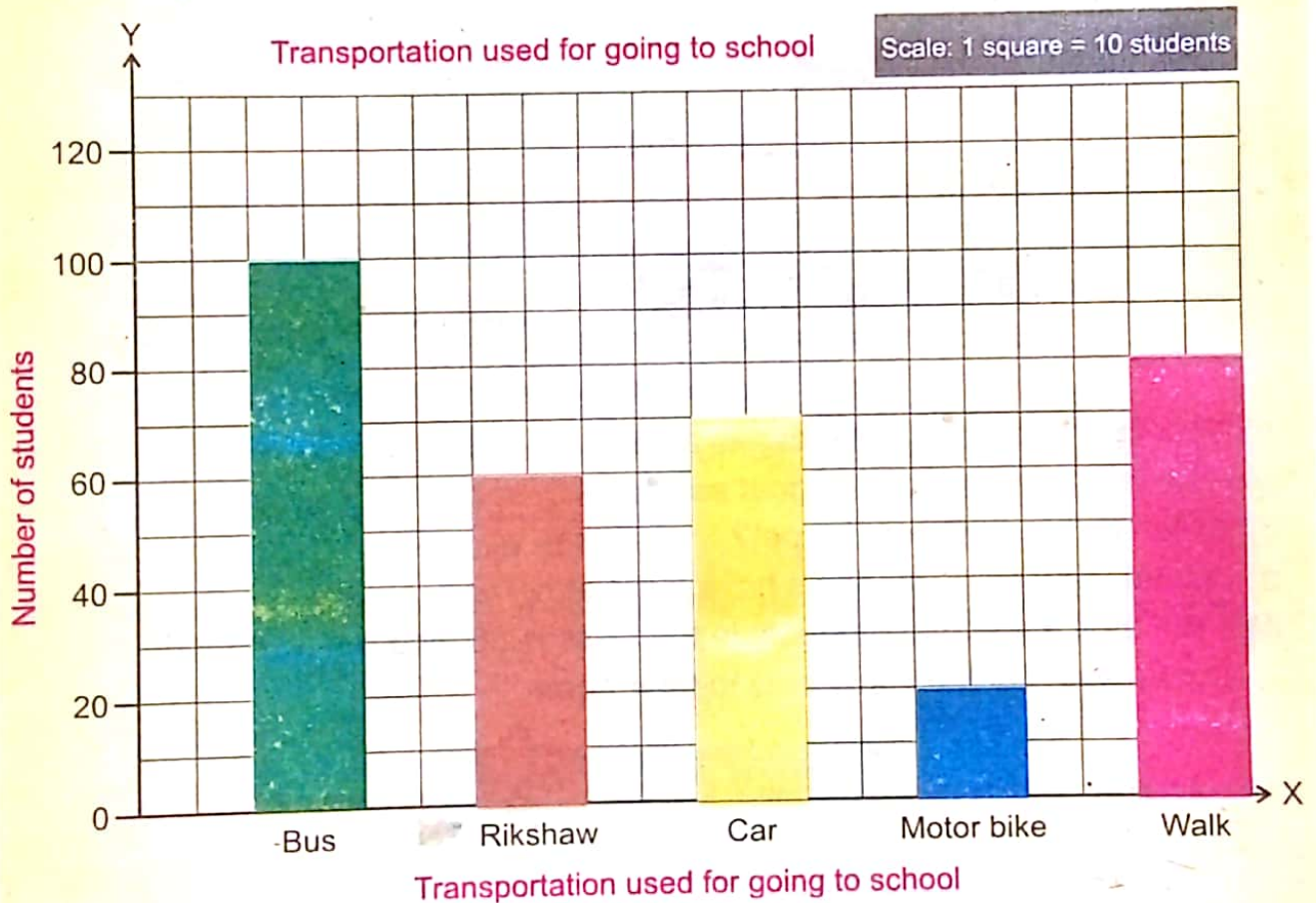| Months	February	March	April	May	June
Number of pateint	2	6	10	12	15

3. During a visit to a zoo the children saw different number of animals whose detail is given below. Draw its vertical bar graph.

Animals	Lion	Elephant	Monkey	Cheeta	Snake	Giraffe	Zebra
Number of animals	4	2	8	3	12	6	10

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4. In the following table the values of temperature in Lahore during a week of August are given. Draw a horizontal bar graph.

| Days of week	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Temperature (°C)	32	33	30	32	36	40	38

5. Study the graph carefully to answer the given questions.

Transportation used for going to school — Scale: 1 square = 10 students

Y axis: Number of students
X axis: Transportation used for going to school
(Bus, Rikshaw, Car, Motor bike, Walk)

a. How many students come to school by car?

b. Is the number of students coming to school on motorcycle less than those coming by rikshaw? If yes, then how much less?

c. Which means of transport do most students use and what is the number of students coming to school by this means?

d. What is the total number of students coming by car, rikshaw and bus altogether?

e. Tell the number of students coming to school on foot.

6. Study the graph carefully to answer the given questions

Pet animals Scale: 1 square = 1 student
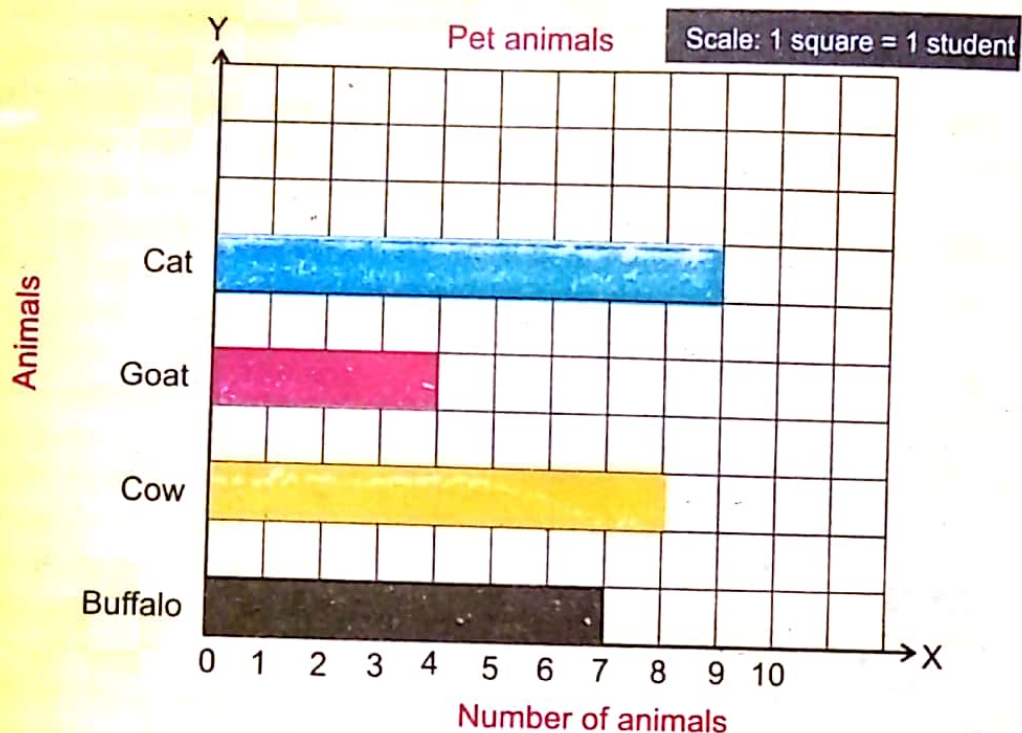
a) How many students have cat as a pet?
b) How many students have goat as a pet?
c) Which is the most popular pet?
d) In total, how many students have a pet at home?
e) If the total number of students in the class is 35, find out how many students do not have any pets in their home.

I Have Learnt

- Finding and describing average of given quantities in the data
- Solving real life situations involving average
- Organizing the given data using bar graph.
- Reading and interpreting a bar graph given in horizontal and vertical form
- Drawing horizontal and vertical bar graphs for given data
- Solving real life situations using data presented in bar graphs.

Vocabulary

Average

Data

Bar Graph

Horizontal Bar Graph

Vertical Bar Graph

Review Exercise

1. Choose the Correct option.

a) The average of a number of items can be found by _____ .

    i)   Dividing sum of items by number of items

    ii) Adding sum of items and number of items

    iii) Multiplying sum of items by number of items

    iiv) Subtracting sum of items from number of items

b) If a student got 19, 21, 22, 24 and 19 marks in different subjects in the monthly test, his average marks will be_____.

    i) 19   ii) 21   iii) 22   iv) 25

c) To find the sum of some values whose average is known ,the following formula is used

    i)   sum of items = average of items + number of items

    ii) sum of items = average of items – number of items

    iii) sum of items = average of items × number of items

    iiv) sum of items = $\dfrac{\text{average of items}}{\text{number of items}}$

d) If the sum of some quantities is 600 and the average is 50, then number of quantities will be_____

    i) 15   ii) 12   iii) 10   iv) 5

e) Ahmed jumped 12 times in first minute, 9 times in second minute and 15 time in third minute. What will be the average of number of jumps Ahmed did.

    i) 9   ii) 11   iii) 12   iv) 15

2. A labourer earned Rs.1200 on the first day, Rs.1000 on the second day, Rs.1500 on the third day, Rs.1300 on the fourth day and Rs.1200 on the fifth day. Find out how many rupees he earned on average in five days?

3. Find out the average of six odd numbers from 1 to 11, and also find the average of six even numbers from 2 to 12.Tell which of these two average is greater in value, the even one or odd one?

4. A pharmacy earned a profit of Rs.50000 in the first month, Rs.62000 in the second month, Rs.68000 in the third month, Rs.78000 in the fourth month and Rs. 65000 in the fifth month. Draw a vertical bar graph of the profit of the company for the five months.

5. Fifth graders were asked to vote for their most favourite subjects. The following bar graph shows their responses. Read the graph carefully to answer the given questions.
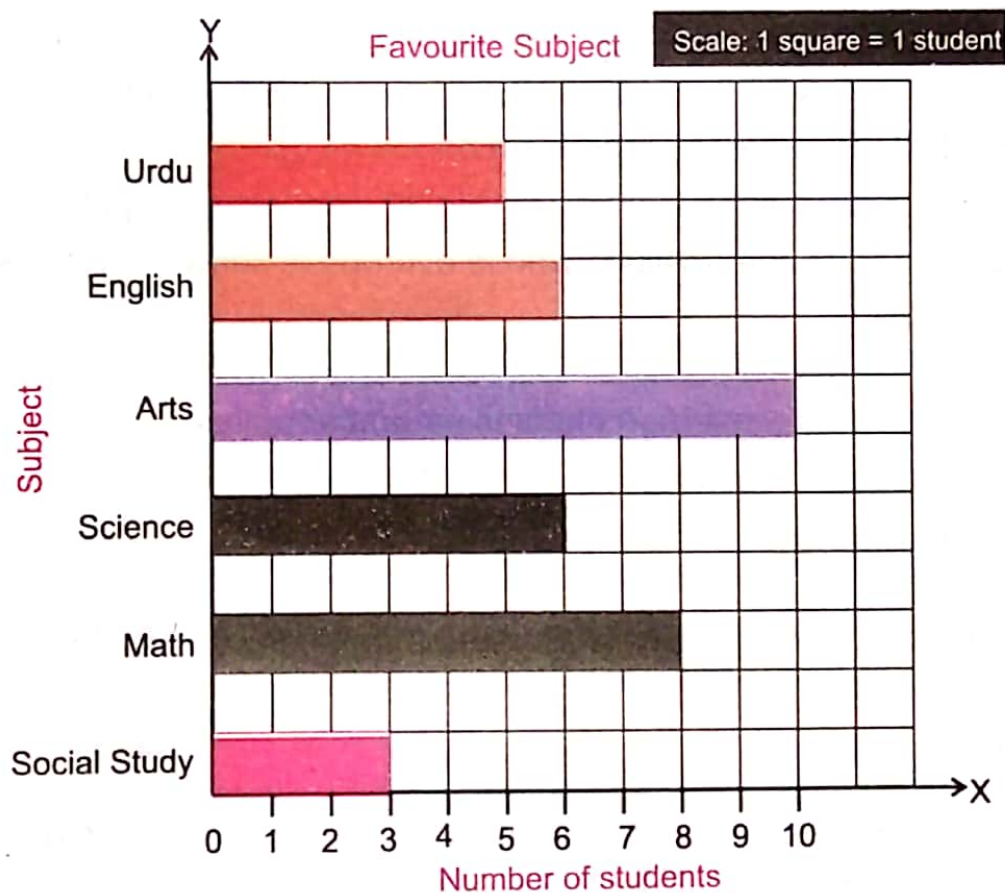
a) A total of how many students chose Science and Mathematics?

b) How many students chose Arts?

c) How many more students chose Math than science as their favourite subject?

d) Which subjects are liked by the same number of students and what is their number?

e) Study the graph to find out the total number of students in grade 5.

f) Tell the most favourite and the least favourite subject of grade 5 students.